AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for channel selective power control of a wavelength division multiplexed optical signal propagating in an optical fiber, the method including the steps of:

selecting at least one channel within said optical signal having higher than a desired power level;

establishing a resonance to the selected channel, the resonance providing a selection region where said selected channel has a substantially increased power density relative to channels out of resonance; and

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attenuating said selected channel a desired amount by adjusting the properties of said selection region,

wherein the step of establishing a resonance comprises the sub-steps of:

providing an external resonator, which is defined by a first and a second mirror, said first and said second mirror being provided outside and on opposite sides of the optical fiber; and

deflecting light between the optical fiber and the external resonator, said deflecting being effected by a blazed phase grating provided in a core of said optical fiber.

2. (Currently Amended) ~~A~~ The method as set forth in claim 1, in which the step of selecting at least one channel having higher than a desired power level is performed by means of spectrum analysis of the wavelength division multiplexed optical signal.

3. (Canceled)

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4. (Currently Amended) ~~A~~ The method as set forth in claim 1, in which the step of attenuating is performed by introducing a loss in the selection region.

5. (Currently Amended) ~~A~~ The method as set forth in claim 4, in which the step of attenuating is performed by introducing an absorbing element in the selection region.

6. (Currently Amended) ~~A~~ The method as set forth in claim ~~3~~1, in which the step of attenuating is performed by introducing an absorbing element inside the external resonator.

7. (Currently Amended) ~~A~~ The method as set forth in claim 4, in which the step of attenuating is performed by making the selection region leaky, light thereby being caused to leak out of the same.

8. (Currently Amended) ~~A~~ The method as set forth in claim ~~3~~1, in which the step of attenuating is performed by changing the phase of the selected channel in the selection

region relative to the phase of the selected channel in the ~~waveguiding structure~~ optical fiber, thereby causing destructive interference on the selected channel.

9. (Currently Amended) ~~A~~ The method as set forth in claim 8, in which the phase of the selected channel is changed by making a parallel displacement of the first and the second mirror with respect to the ~~waveguiding structure~~ optical fiber.

10. (Currently Amended) ~~A~~ The method as set forth in claim 8, in which the phase of the selected channel is changed by altering the refractive index in at least some portion of the external resonator, thereby altering the optical path length in the resonator.

11. (Currently Amended) ~~A~~ The method as set forth in claim 9~~ or 10~~, further comprising the step of altering the separation between the first and the second mirror.

12. (Currently Amended) ~~A~~ The method as set forth in claim 1, further comprising the steps of:

deflecting the selected channel from a first ~~waveguiding structure~~ optical fiber carrying the optical signal into an external selection region; and

coupling the selected channel from the selection region into a second ~~waveguiding structure~~ optical fiber;

the step of attenuating the selected channel being performed by absorbing light in said selection region.

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13. (Currently Amended) ~~A~~ The method as set forth in claim 12, in which the step of establishing a resonance comprises the step of providing an external resonator enclosing both the first and the second ~~waveguiding structures~~ optical fibers, said external resonator being defined by a first and a second mirror arranged outside and on opposite sides of the first and the second ~~waveguiding structures~~ optical fibers.

14. (Currently Amended) ~~A~~ The method as set forth in claim 12, in which the step of establishing a resonance comprises the step of providing at least one Bragg grating in each of the first and the second ~~waveguiding structures~~ optical fibers.

15. (Currently Amended) ~~A~~ The method as set forth in claim 14, in which at least one of the Bragg gratings is a chirped grating.

16. (Currently Amended) ~~A~~ The method as set forth in any one of the claims 12 to 15, in which the step of deflecting the selected channel from the first ~~waveguiding structure~~ optical fiber is performed by means of a first blazed phase grating in the first ~~waveguiding structure~~ optical fiber, and the step of coupling the selected channel into the second

~~waveguiding structure~~ optical fiber is performed by means of a second blazed phase grating in the second ~~waveguidizig~~ structure optical fiber.

17. (Currently Amended) ~~A~~ The method as set forth in claim 1, in which the resonance to the selected channel is established by arranging one or several Bragg gratings inside ~~a waveguiding structure, preferably an~~ the optical ~~fibre~~ fiber, carrying the optical signal.

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18. (Currently Amended) ~~A~~ The method as set forth in claim 17, in which the resonance is established by arranging a chirped Bragg grating in the ~~waveguiding structure~~ optical fiber, said grating being resonant to different wavelength channels at different portions along the same.

19. (Currently Amended) ~~A~~ The method as set forth in claim 18, in which the selection region is comprised within the resonance, and attenuation is provided by introducing a loss in said selection region.

20. (Currently Amended) ~~A~~ The method as set forth in claim 19, in which the selection region is made leaky by bending a selected portion of the ~~waveguiding structure~~ optical fiber, light of predominantly the selected channel thereby being caused to leak out from the selection region.

21. (Currently Amended) ~~A~~ The method as set forth in claim 19, in which the selection region is made leaky by moving a light guiding probe close enough to the ~~waveguiding structure~~ optical fiber to allow evanescent coupling of light from the ~~waveguiding structure~~ optical fiber into said probe.

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22. (Currently Amended) ~~A~~ The method as set forth in claim ~~3~~1, in which the deflector is provided within an internal resonator in the ~~waveguiding structure~~ optical fiber, thereby enhancing the spectral selectivity of the channel ~~balancing~~ selective power control.

23. (Currently Amended) ~~A~~ The method as set forth in claim ~~3~~1, further comprising the step of tuning the external resonator to the wavelength of the selected channel.

24. (Currently Amended) ~~A~~ The method as set forth in claim 23, in which the step of tuning the resonance is performed by adjusting the separation between the first and the second mirror.

25. (Currently Amended) ~~A~~ The method as set forth in claim 23, in which the step of tuning the resonance is performed by tilting the external resonator with respect to the ~~waveguiding structure~~ optical fiber.

26. (Currently Amended) ~~A~~ The method as set forth in claim 23, in which the step of tuning the resonance is performed by:

adjusting the separation between the first and the second mirror; and

tilting the external resonator with respect to the ~~waveguiding structure~~ optical fiber.

27-34. (Canceled)

35. (Currently Amended) An arrangement for channel selective power control of a wavelength division multiplexed optical signal propagating in ~~a waveguiding structure, preferably~~ an optical ~~fibre~~ fiber, the arrangement comprising:

a spectrum analyser arranged to analyse the power spectrum of said optical signal and to identify and select at least one channel within said optical signal having higher than a desired power level;

an attenuator arranged to attenuate a selected channel within said optical signal; ~~and~~

a resonator arranged to provide a selection region where the selected channel has a substantially increased power density relative to channels out of resonance, said resonator being defined by a first and a second mirror which are provided outside and on opposite sides of the optical fiber; and

a deflector in the form of a blazed phase grating provided in a core of the optical fiber,

the attenuator further being arranged to attenuate said selected channel by changing the properties of said selection region.

36. (Currently Amended) ~~An~~ The arrangement as set forth in claim 35, comprising a plurality of attenuators and a plurality of resonators, said attenuators and said resonators being arranged to attenuate a plurality of wavelength channels within a wavelength division multiplexed optical signal.

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37. (Currently Amended) ~~An~~ The arrangement as set forth in claim 35, further comprising a controller, said controller being arranged to receive, from the spectrum analyser, information identifying the at least one channel having higher than a desired power level, and to control the attenuator to provide a desired level of attenuation to said at least one channel.

38. (Currently Amended) ~~An~~ The arrangement as set forth in claim 37, wherein the spectrum analyser is operatively connected to the optical ~~fibre~~ fiber upstream from the attenuator.

39. (Currently Amended) ~~An~~ The arrangement as set forth in claim 37, wherein the spectrum analyser is operatively connected to the optical ~~fibre~~ fiber downstream from the attenuator.

40. (Currently Amended) ~~An~~ The arrangement as set forth in claim 38, wherein a second spectrum analyser is operatively connected to the optical ~~fibre~~ fiber downstream from the attenuator, said second spectrum analyser also being operatively connected to the controller.

41-~~42~~. (Canceled)

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43. (Currently Amended) ~~An~~ The arrangement as set forth in claim ~~42~~ 35, wherein the attenuator is arranged to introduce a loss in the selection region.

44. (Currently Amended) ~~An~~ The arrangement as set forth in claim ~~42~~ 35, wherein the attenuator is arranged to change the properties of the selection region in such a way that the phase of light being coupled back into the ~~waveguiding structure~~ optical fiber from the external resonator is out of phase with light of the resonant wavelength propagating in the ~~waveguiding structure~~ optical fiber, thereby causing attenuation by destructive interference.

45. (Currently Amended) ~~An~~ The arrangement as set forth in claim ~~42~~ 35, wherein a plurality of external resonators is coupled to a common channel of the WDM signal, said plurality of external resonators thereby constituting a set of sub-resonators associated with said channel.

46. (Currently Amended) ~~An~~ The arrangement as set forth in claim ~~42~~ 35, wherein the external resonator is adjustable in such way that the wavelength to which the external resonator is resonant can be tuned.

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47. (Currently Amended) An optical device, comprising:

~~a waveguide, preferably~~ an optical ~~fibre~~ fiber, capable of carrying an optical signal having a plurality of wavelength channels;

a resonator operatively connected to said waveguide, the resonator being resonant to at least one wavelength interval within said plurality of wavelength channels, said resonator establishing a region where the resonant wavelength interval has a substantially increased power density relative to wavelength intervals out of resonance; and

a controller arranged to adjust said resonator such that a controlled amount of power is removed from the resonant wavelength;[[.]]

said resonator being defined by a first and a second mirror which are provided outside and on opposite sides of the optical fiber, and said optical fiber comprising a deflector in the form of a blazed phase grating in a core of the optical fiber, for deflecting light from the optical fiber into said resonator.

48. (Currently Amended) ~~A~~ The device as set forth in claim 47, wherein the resonator is controllable such that the wavelength interval to which the resonator is

resonant can be tuned, thereby allowing removal of power from different wavelength intervals at different instants.

49-50. (Canceled)

51. (Currently Amended) ~~A~~ The device as set forth in claim ~~49~~ 47, wherein the controller is operative to change the phase of light of the resonant wavelength in the resonator relative to the phase of light of the same wavelength in the ~~waveguide~~ optical fiber, fiber thereby causing destructive interference on said wavelength.

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52. (Currently Amended) ~~A~~ The device as set forth in claim 51, wherein the controller is operative to change the phase of light in the resonator by causing a parallel displacement of the external resonator with respect to the ~~waveguide~~ optical fiber.

53. (Currently Amended) ~~A~~ The device as set forth in claim 51, wherein the controller is operative to change the phase of light in the resonator by causing a change in the refractive index in at least some portion of the external resonator.

54. (Currently Amended) ~~A~~ The device as set forth in claim ~~49~~ 47, wherein the controller is operative to provide absorption in the external resonator.

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55. (Currently Amended) ~~A~~ The device as set forth in claim 54, further comprising a controllable liquid crystal provided inside the external resonator, the controller being operative to provide absorption by changing the transmittance of said liquid crystal.

56-59. (Canceled)